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(54) Rocking lever for opening manhole covers.

(57) This invention discloses a rocking lever for opening manhole covers, said lever comprising a primary arm (1) which is made up of a handle upper length (1') substantially straight and of a lower length (1") whichis bent at the point close to its connection with said upper length and which is substantially straight at its lower end; a fulcrum (3) arranged below said primary arm (1) about at the point corresponding to said bent zone, a secondary rocking arm (5) which is coupled to the lower end of the primary arm (1) in a way that allows said secondary arm to oscillate; and a hook (7) that is carried by said secondary arm (5) at its lower portion.

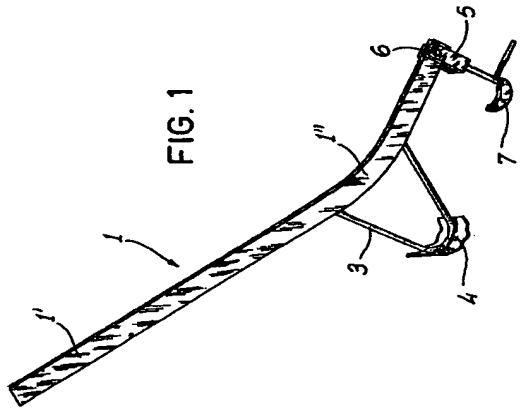

FIG. 1

EP 0 484 285 A1

This invention relates to a rocking lever for opening manholes.

More particularly, this invention relates to a lever which has been suitably designed so that it allows each kind of manhole cover to be opened in an extremely easy way and with a minimum effort.

Manhole covers are opened at present manually or by means of hooks connected to short brackets.

Thus the workman has to exert a very remarkable effort to lift in a bent position even weights of 80-50 kg, and in addition he has to shift laterally said cover while keeping in the same bent position so as to open the well completely.

Obviously, this involves an enormous physical effort that might reflect on the backs and on the spinal column, with the additional risk of traumas and of sprains.

Moreover, such procedures also involve safety problems. For instance, in winter, because of the frost, it is very difficult to open the manhole cover because said cover is blocked by ice so that the workman has to strike the manhole cover itself in order to break the ice crust, so risking the occurence of sparks in environments close to reservoirs containing inflammable materials.

In the light of what has been mentioned above, it is clearly evident that there would be a great advantage in the possibility of having at disposal a rocking lever like that suggested in this invention, which allows the cover of a manhole to be lifted and shifted without having to exert excessive efforts and working in a position of the body surely much more comfortable.

Moreover, a device like that which is proposed in this invention obviates all safety problems as it allows the hardest manhole covers to be opened by a simple snap blow, even if such covers are blocked by the frost, without having recourse to further tricks.

These and other results are obtained according to this invention by the proposal of realizing a rocking lever for opening manholes, which lever is provided with a primary arm having a first handle zone which is substantially straight and a bent zone, a fulcrum being provided at the point corresponding to said bent zone, at the bottom side, together with a secondary arm which is pivoted at the end of the primary arm opposite to the end of the handle, which secondary arm bears at its lower portion, a hook for lifting the cover of the manhole.

Accordingly, it is a specific object of this invention a rocking lever for opening cover manholes, which comprises a primary arm made up of an upper handle length which is substantially straight and of an upper bent length, the bend being at a position close to its connection with said upper length which is substantially straight at its lower end; a fulcrum arranged below said primary arm, about at the point corresponding to said bent zone; a secondary rocking arm which is coupled so as to be free of rocking at the lower end of the primary arm; and a hook which is carried by said secondary arm at a lower position.

According to a particular kind of embodiment of the rocking lever of this invention, the handle length of the primary arm is provided, substantially at an intermediate position, with an articulated joint for making it closable, said joint being in particular made up of a hinge which is realized by means of a pivot and knocker.

Again according to this invention, a toothed plate can be provided below said fulcrum in order to realize a rough support.

Said fulcrum will preferably be made up of a member which is substantially in th shape of a U.

Further according to this invention, one or more holes for the rocking coupling of said secondary arm can be provided at the lower end of said primary arm.

Again according to this invention, the secondary arm can be provided with one or more holes for realizing said coupling at different heights with said primary arm.

The coupling between the primary arm and the secondary arm can be realized as a direct connection or through the interposition of a thirs arm.

A support member provided in its front position with a transverse tubular member can be provided in front of said rocking lever according to the present invention.

This invention will be now disclosed according to some preferred embodiments of the same with particular reference to the Figures of the enclosed drawings, wherein:

Figure 1 is a perspective view of a first kind of embodiment of the rocking lever according to this invention;

Figure 2 is a perspective view of the lever shown in Figure 1 with the foldable handle;

Figure 3 is a perspective view of a second embodiment of the rocking lever according to this invention;

Figre 4 is a perspective view of the lever of Figure 3 with the foldable handle;

Figure 5 is a perspective view of a third kind of embodiment of the rocking lever acording to this invention;

Figure 6 is a perspective view of the lever of Figure 5 with the foldable handle;

Figure 7 is a perspective view of a fourth kind of embodiment of the rocking lever according to this invention;

Figure 8 is a perspective view of a fifth kind of embodiment of the rocking lever according to this invention;

Figure 9 is a perspective view of a rocking lever support according to this invention; and

Figures 10a, 10b, 10c, 10d and 10e show different kinds of embodiment of the hook of said rock-

ing lever according to this invention.

With reference first to the Figures 1 and 2, it can be observed that said rocking lever accordint to this invention comprises a primary arm 1 which is made up of a straight handle upper length 1' and of a lower length 1" which is slightly bent at the point corresponding to its connection with said handle length 1' and then it is again straight at its opposite end.

In Figure 2, the handle length 1' of said primary arm 1 is provided with an articulated joint 2, at about half its length so that it can be folded. Said articulated joint 2 is provided with a hinge realized by means of a pivot and a knocker that warrant the rigidity of the primary arm 1 during employment.

A fulcrum 3 which is substantially in the shape of a U is connected by welding to said length 1" at the point corresponding to the bent zone of said length 1" and below the same.

A toothed plate 4 is provided below said fulcrum 3, such so realizing a rough support.

The rocking secondary arm 5 is provided at the free end of the straight zone of the length 1" of said primary arm 1, said secondary arm being coupled to said length 1" by means of a pivot 6 passing through a hale provided in the length 1" itself.

The secondary arm 5 ends in a hook 7 which can be made up of any one of the hooks 7 shown in the Figures 10a-10e, or with hooks of a suitable shape according to the needs in question.

In the following disclosure of the kind of embodiment of this invention which is illustrated in the Figures, the same reference numerals will be employed for pointing out corresponding portions.

The kind of embodiment shown in the Figures 3 and 4 provides a length 1" which is elongated in its straight zone so as to give the possibility of providing two holes 8 for inserting the pivot 6 which realizes the coupling of the secondary arm 5.

Thus it is possible to open covers of manholes having both the hooking point in the central position and the hooking point at a position close to their edge.

The hook 7 which is shown is that of Figure 10c.

The rocking lever shown in Figures 5 and 6 has a very short primary arm 1 so that such lever shows suitable for opening small manholes and, in addition it is not bulky so that this device can be carried within a bag.

The hook shown in Figures 5 and 6 is that of Figure 10e.

The rocking lever of Figure 7 comprises a primary arm 5 provided with two holes 9 for allowing the pivot 6 that realizes the coupling with the primary arm 1 to pass, so that the height of the hook 7 can be adjusted.

The hook 7 shown in Figure 7 as well as in the next Figure 8, is that shown in Figure 10b.

In the kind of embodiment shown in Figure 8, the coupling between the scondary arm 5 and the primary arm 1 is obtained through the interposition of a third arm 10 and of a connection portion 11.

Said connection portion 11 is provided with a hole 12 which couples with a corresponding hole in the arm 10 and is rigidly fastened to the arm 1.

The arm 10 is provided with a second hole that couples with one of the holes 9 in the arm 5 by means of the pivot 6.

Finally, Figure 9 shows a support 13, whose arm 14 is provided at one of its ends with a cylindrical member 15 and at the opposite end, with two holes 16 which are to be coupled to the primary arm 1 and for supporting the secondary arm 5.

The support 13 allows the weight to be distributed between the lever and the cylindrical member 15 so as to allow heavier loads to be lifted, so giving the lever itself a higher stability and avoiding side oscillations. The cylindrical member 15, running below the open cover of the manhole makes the operation of lifting the cover itself easier.

As can be easily understood, the rocking lever according to this invention is suitable for opening all covers of manholes which are level on the pavement; both in the case said covers have hooking points near their edges and in the case that such covers have their hooking points in the central position.

The rocking lever is to be positioned near the manhole to be opened, at the points close to one of the hooking points provided in the cover purposely, where the hook 7 is to be inserted so as to exert a grip, in order to obtain the optimal position for the fulcrum 3, possibly with the aid of a foot; then by acting on the handle 1', the rocking lever will be caused to oscillate so that it will lift the cover taking it out of its housing and allowing the same to come out and to be placed on the pavement or on the proper frame; finally, taking the hook 7 out of the gripping point and extending the secondary arm 5 completely, it will be possible to drag the cover laterally, by hooking the same at its edge, so as to complete the operation of opening the manhole. By carrying out this final operation inversely, it will be possible to close the manhole again.

Claims

1. A rocking lever for opening manhole covers, characterized in that it comprises a primary arm 1, made up of a handle upper length 1' which is substantially straight, and of a lower length 1" which is bent at a position close to its connection with said upper length and is substantially straight at the point corresponding to its lower end; a fulcrum 3 which is arranged below said primary arm 1, about at the point corresponding to said bent zone; a secondary rocking arm 5 which is coupled so as to be free of oscillating at the lower end of the primary arm 1; and a hook 7 which is carried by said secondary arm 5 at a lower position.

2. A rocking lever according to claim 1, characterized in that said handle length 1' of the primary arm 1 is endowed with an articulated joint 2 substantially at the intermediate position.

3. A rocking lever according to claim 2, characterized in that said articulated joint is made up of a hinge realized by means of a pivot and a knocker.

4. A rocking lever according to any one of the preceding claims, characterized in that a toothed plate 4 is provided below said fulcrum 3.

5. A rocking lever according to any one of the preceding claims, characterized in that said fulcrum 3 is made up of a member which is substantially in the shape of a U.

6. A rocking lever according to any one of the preceding claims, characterized in that two holes8 for realizing the rocking coupling of said secondary arm 5 are provided at the lower end of said primary arm 1.

7. A rocking lever according to any one of the preceding claims, characterized in that said secondary arm 5 is provided with two holes 9 for realizing the coupling with said primary arm 1 at different heights.

8. A rocking lever according to any one of the preceding claims, characterized in that the coupling between said primary arm 1 and said secondary arm 5 is realized through the interposition of a third arm 10.

9. A rocking lever according to any one of the preceding claims, characterized in that a supporting member 13 is provided in front of said primary arm 1.

10. A rocking lever according to claim 9, characterized in that said supporting member 13 is provided with a roller in its front position and with one or more holes 16 in its rear position, such holes being intended for realizing the coupling with said primary arm 1 and for the oscillating support of said secondary arm 5.

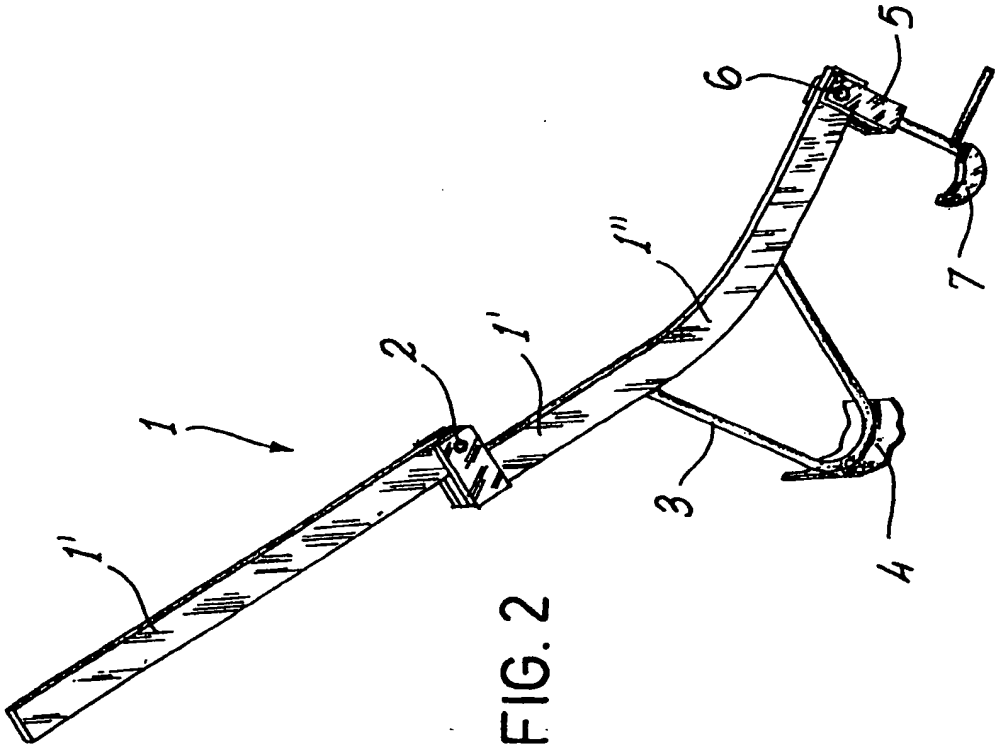

FIG. 2

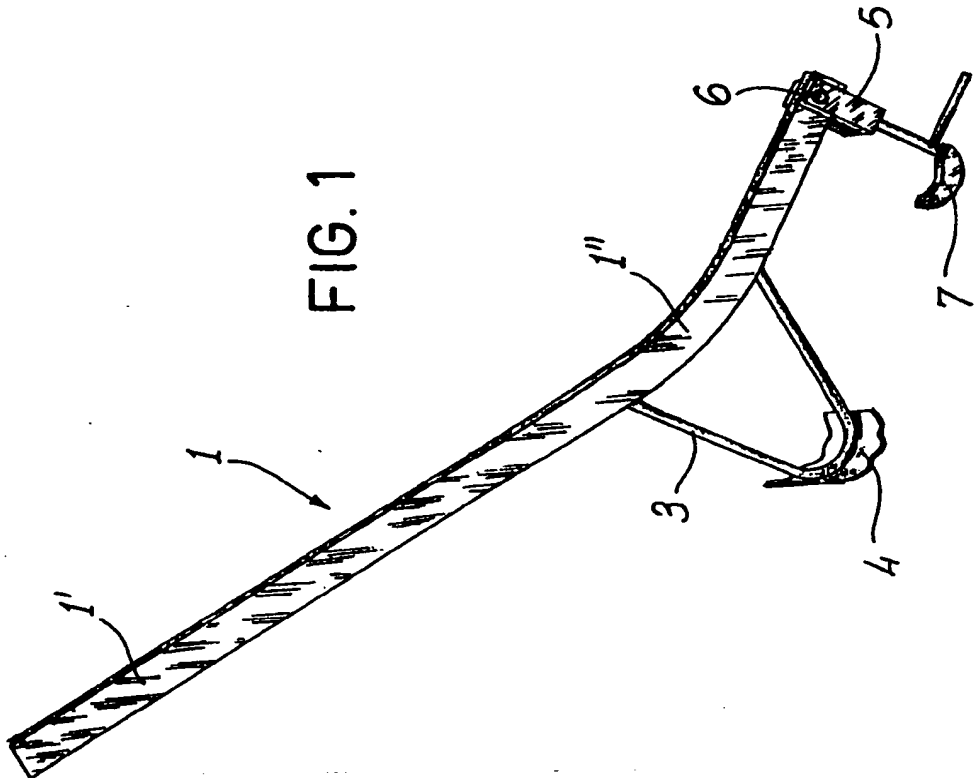

FIG. 1

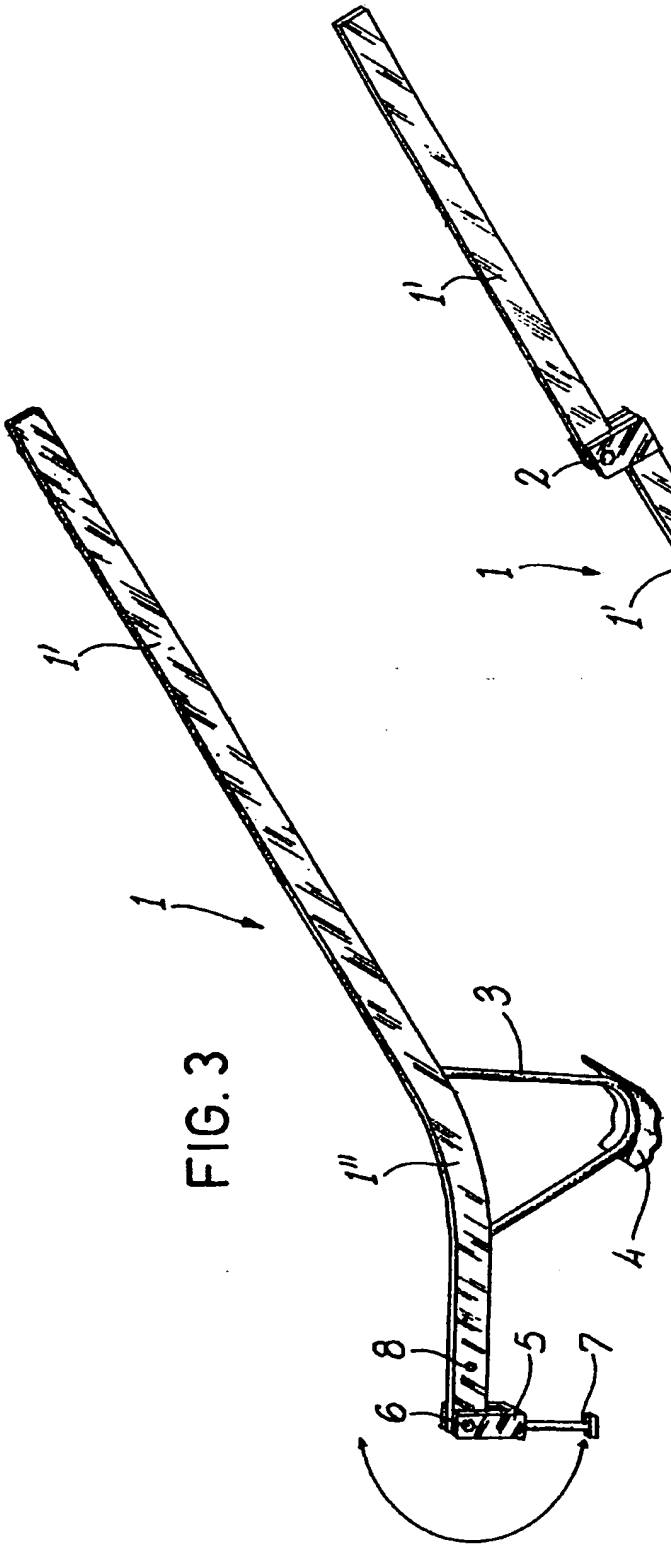

FIG. 3

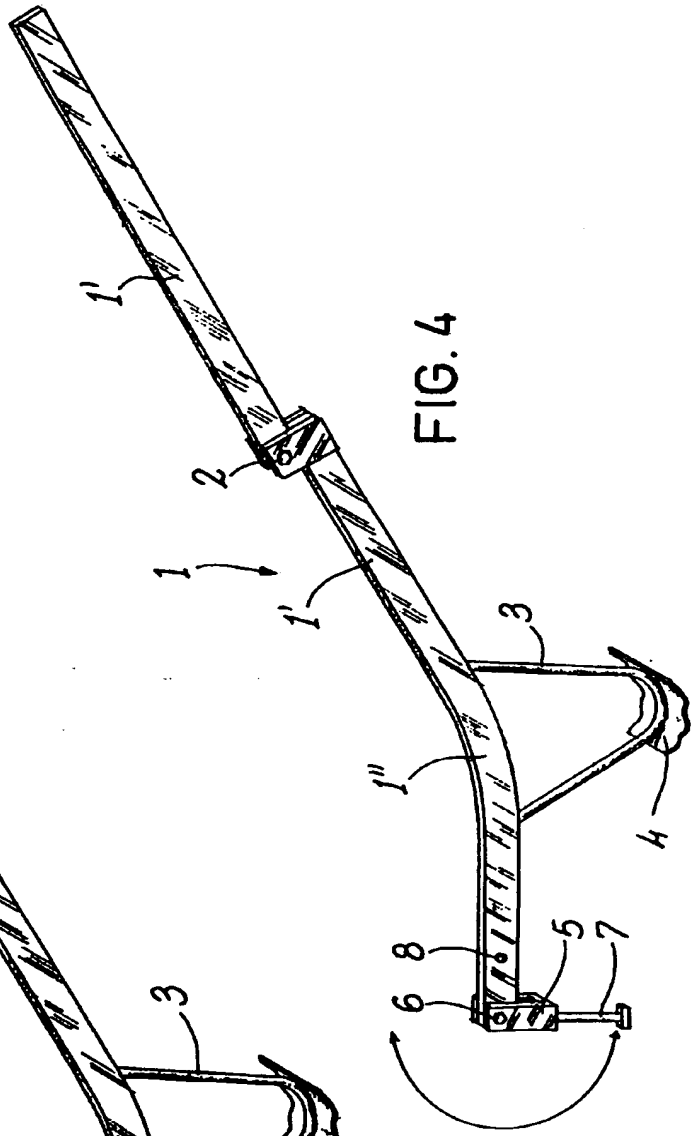

FIG. 4

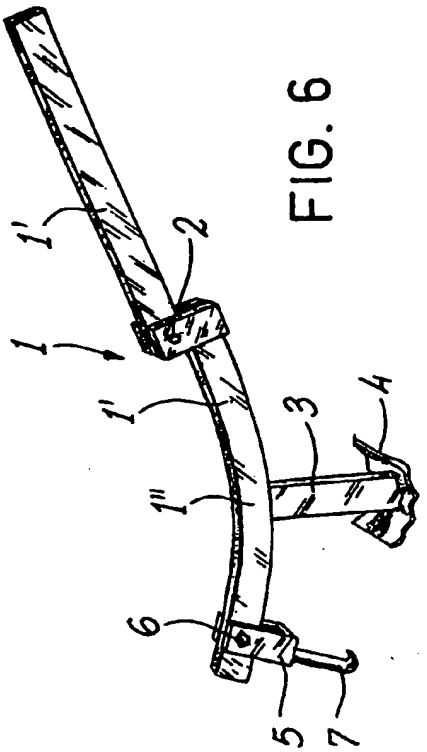

FIG. 6

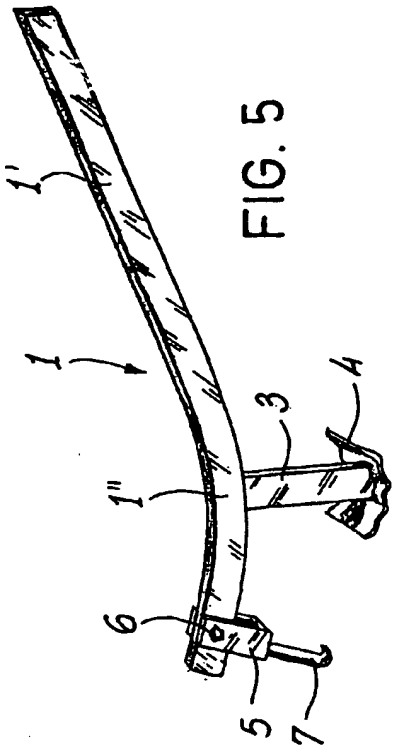

FIG. 5

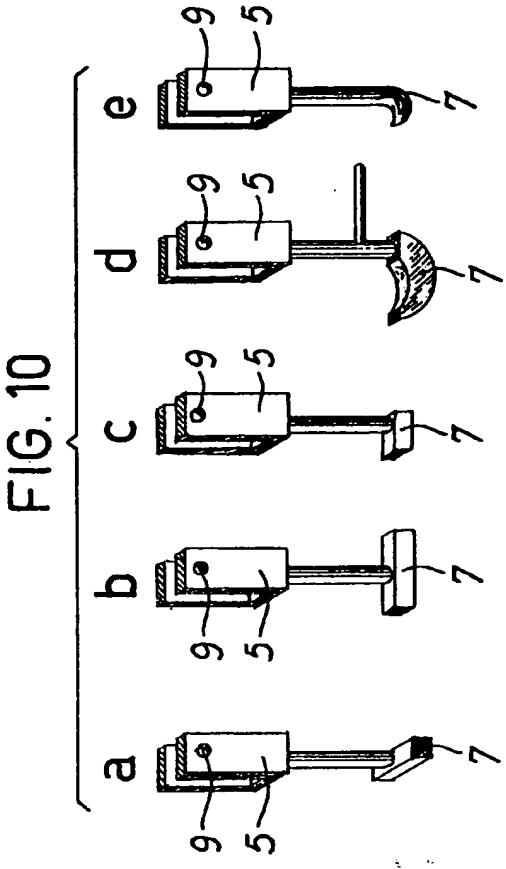

FIG. 10

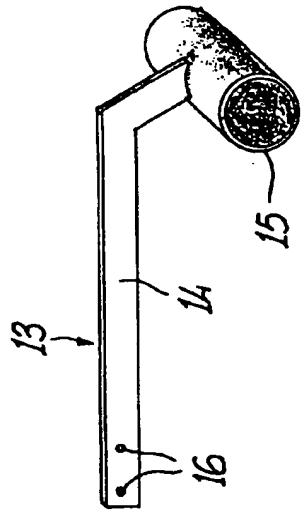

FIG. 9

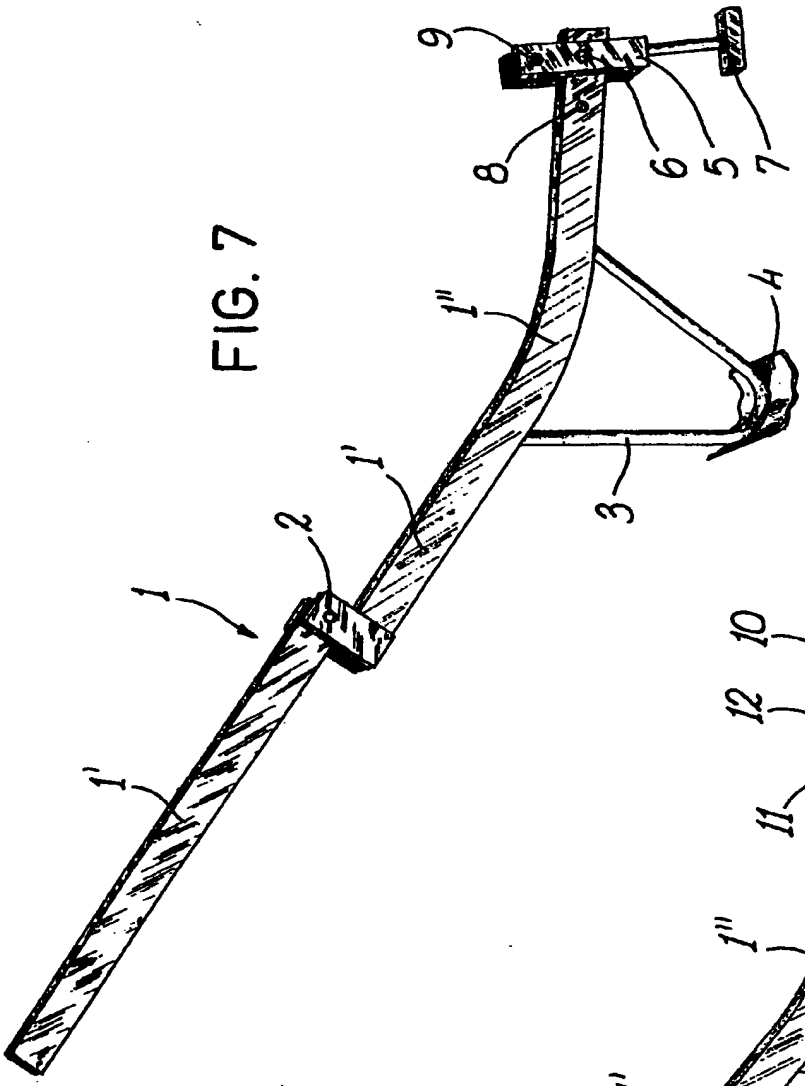

FIG. 7

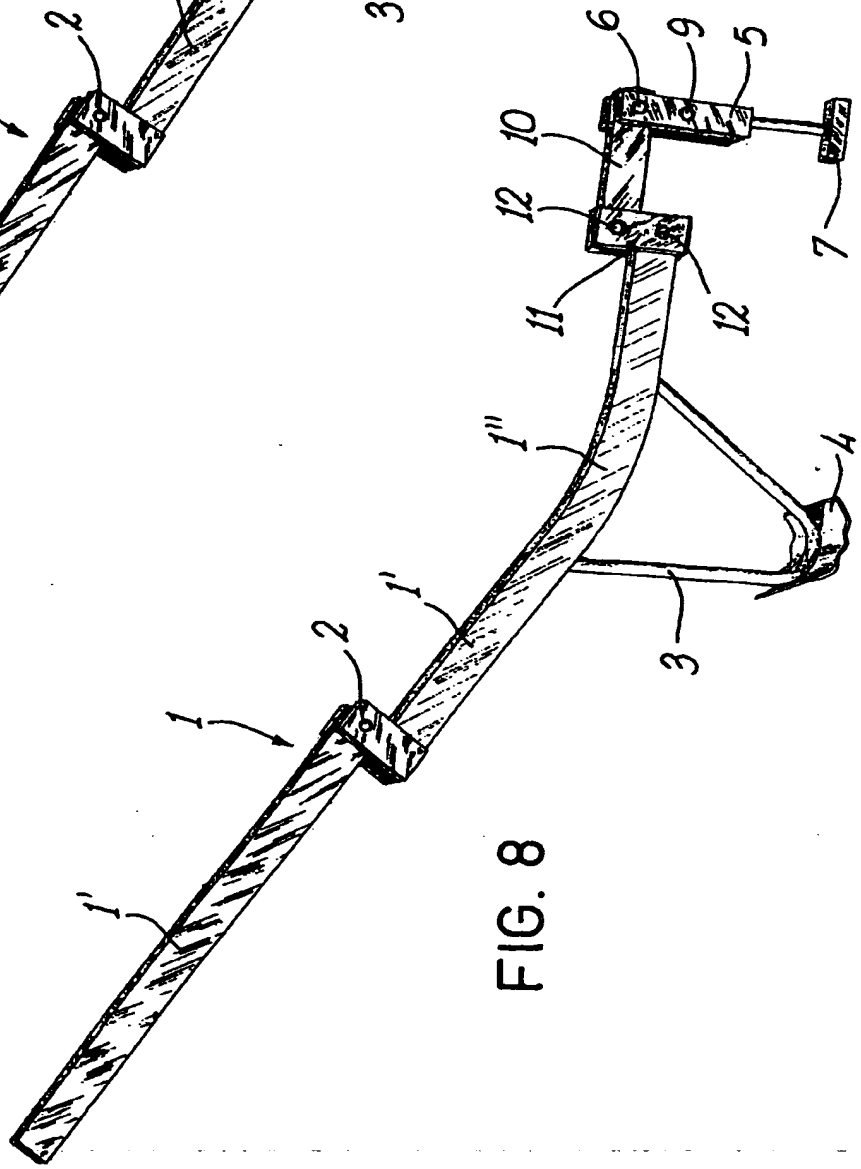

FIG. 8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 83 0414

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	FR-A-2 427 996 (ENTREPRISE J. SERPOLLET) * Page 3, line 13 - page 4, line 13 *	1,2,3,5	B 66 F 19/00
X	DE-A-2 646 646 (BECK) * Complete document *	1,5,6,9	
X	US-A-3 198 362 (BERG) * Complete document *	1,6	
X	US-A-4 662 607 (MOCHIZUKI) * Abstract; figures 1-5; column 8, lines 11-22; figure 7B *	1,8,9	
X	US-A-4 488 706 (KONO) * Complete document *	1	
A	GB-A-2 136 363 (PETROLEUM EQUIPMENT TRADING CO.)		
A	US-A-3 985 338 (HERRMANN)		TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	GB-A-2 101 558 (GAIR)		B 66 F E 02 D
A	FR-A-2 530 606 (LA CELLULOSE DU PIN)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20-01-1992	VAN DEN BERGHE E.J.J.

CATEGORY OF CITED DOCUMENTS

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